

CLAIMS

What is claimed is:

1. A color fusing apparatus to fuse a color toner onto a recording medium by passing the recording medium through a nip formed by a heat roller and a press roller that press-contacts the heat roller, the press roller comprising:
at least one fusing roller to fuse the color toner onto the recording medium; and
a separation roller, disposed at an outlet through which the recording medium exits the color fusing apparatus, to separate the recording medium from the heat roller.
2. The color fusing apparatus of claim 1, wherein the at least one fusing roller and the separation roller each have greater rigidity than the heat roller.
3. The color fusing apparatus of claim 2, wherein the rigidity of the separation roller is greater than that of the heat roller to form an angle at the outlet between the heat roller and a direction of propagation of the recording medium to separate the recording medium from the heat roller.
4. The color fusing apparatus of claim 2, wherein the heat roller, the at least one fusing roller, and the separation roller are soft rollers, each soft roller comprising a metal core member and a soft member that is softer than metal and installed on an outer circumferential surface of the metal core member, the heat roller, the at least one fusing roller, and the separation roller respectively heating the color toner, fusing the color toner onto the recording medium, and separating the recording medium from the heat roller by the rigidity of each respective soft member.
5. The color fusing apparatus of claim 2, wherein the heat roller and the at least one fusing roller are softer rollers, each soft roller comprising a metal core member and a soft member that is softer than metal and installed on an outer circumferential surface of the metal core member.

6. The color fusing apparatus of claim 5, wherein the separation roller is a metal roller.

7. The color fusing apparatus of claim 6, wherein the separation roller is reversely driven with respect to the heat roller that rotates to transfer the recording medium through the color fusing apparatus.

8. The color fusing apparatus of claim 5, wherein the separation roller is a soft roller comprising a metal core member and a soft member, having a rigidity greater than the soft member of the heat roller, that is installed on an outer circumferential surface of the metal core member of the separation roller.

9. The color fusing apparatus of claim 1, wherein the separation roller has a rigidity greater than that of the heat roller, the at least one fusing roller has a press-contact force sufficient to fuse the color toner on the recording medium, and the separation roller has a press-contact force sufficient to separate the recording medium from the heat roller.

10. The color fusing apparatus of claim 9, wherein the press-contact force of the separation roller with respect to the heat roller creates a separation angle between the heat roller and a direction of propagation of the recording medium to separate the recording medium from the heat roller.

11. The color fusing apparatus of claim 9, wherein the heat roller is a soft roller comprising a metal core member and a soft member that is softer than metal and installed on an outer circumferential surface of the metal core member.

12. The color fusing apparatus of claim 11, wherein the separation roller is a metal roller.

13. The color fusing apparatus of claim 9, wherein the separation roller is a metal roller.

14. The color fusing apparatus of claim 10, wherein the separation roller is a metal roller.
15. The color fusing apparatus of claim 12, wherein the at least one fusing roller is a metal roller.
16. The color fusing apparatus of claim 11, wherein the at least one fusing roller is a metal roller.
17. The color fusing apparatus of claim 9, wherein the at least one fusing roller is a metal roller.
18. The color fusing apparatus of claim 13, wherein the at least one fusing roller comprises a plurality of soft rollers, each soft roller comprising a metal core member and a soft member that is softer than metal and installed on an outer circumferential surface of the metal core member.
19. The color fusing apparatus of claim 12, wherein the at least one fusing roller comprises a plurality of soft rollers, each soft roller comprising a metal core member and a soft member that is softer than metal and installed on an outer circumferential surface of the metal core member.
20. A color fusing apparatus to fuse a color toner onto a recording medium by passing the recording medium through a nip formed by a heat roller and a press roller that press-contacts the heat roller, the press roller comprising:
 - at least one fusing roller contacting the heat roller to fuse the color toner onto the recording medium; and
 - a separation roller, disposed at an outlet through which the recording medium exits the color fusing apparatus, contacting the heat roller to separate the recording medium, which adheres to the heat roller, from the heat roller to eject the recording medium outside the color fusing apparatus.

21. The color fusing apparatus of claim 20, wherein the heat roller is a soft roller comprising a metal core member and a soft member that is softer than the metal core member and installed on an outer circumferential surface of the metal core member and the at least one fusing roller and the separation roller have rigidities different from that of the heat roller.

22. The color fusing apparatus of claim 20, wherein the separation roller has a rigidity greater than that of the heat roller to create a separation angle, between the heat roller and a direction of propagation of the recording medium, at the outlet through which the recording medium exits to separate the recording medium from the heat roller.

23. The color fusing apparatus of claim 22, wherein the at least one fusing roller and the separation roller are soft rollers, each soft roller comprising a metal core member and a soft member that is softer than metal and installed on an outer circumferential surface of the metal core member.

24. The color fusing apparatus of claim 22, wherein the at least one fusing roller and the separation roller are metal rollers.

25. The color fusing apparatus of claim 22, wherein the at least one fusing roller is a soft roller comprising a metal core member and a soft member that is softer than metal and installed on an outer circumferential surface of the metal core member.

26. The color fusing apparatus of claim 22, wherein the separation roller is a metal roller.

27. The color fusing apparatus of claim 22, wherein the separation roller is a soft roller comprising a metal core member and a soft member that is softer than metal and installed on an outer circumferential surface of a metal core member.

28. The color fusing apparatus of claim 22, wherein the separation roller is reversely driven with respect to the heat roller that rotates to transfer the recording medium through the color fusing apparatus.

29. The color fusing apparatus of claim 21, wherein the at least one fusing roller and the separation roller are soft rollers, each soft roller comprising a metal core member and a soft member that is softer than metal and installed on an outer circumferential surface of the metal core member.

30. The color fusing apparatus of claim 21, wherein the at least one fusing roller and the separation roller are metal rollers.

31. The color fusing apparatus of claim 21, wherein the at least one fusing roller is a soft roller comprising a metal core member and a soft member that is softer than metal and installed on an outer circumferential surface of the metal core member.

32. The color fusing apparatus of claim 21, wherein the separation roller is a metal roller.

33. The color fusing apparatus of claim 21, wherein the separation roller is a soft roller comprising a metal core member and a soft member that is softer than metal and installed on an outer circumferential surface of a metal core member.

34. The color fusing apparatus of claim 21, wherein the separation roller is reversely driven with respect to the heat roller that rotates to transfer the recording medium through the color fusing apparatus.

35. An apparatus to fuse a color toner onto a recording medium, comprising:
a heat roller;
a fusing roller contacting the heat roller to fuse the color toner onto the recording medium; and
a separation roller separate from, and adjacent to, the fusing roller and contacting the heat roller to separate the recording medium from the separation roller.

36. The apparatus of claim 35, wherein the heat roller, the fusing roller, and the separation roller are soft rollers.

37. The apparatus of claim 36, wherein a diameter of the fusing roller is about the same as a diameter of the separation roller, and the diameter of the fusing roller and the diameter of the separation roller are each less than a diameter of the heat roller.

38. The apparatus of claim 36, wherein a rigidity of the fusing roller is less than a rigidity of the heat roller and a rigidity of the separation roller is greater than the rigidity of the heat roller.

39. The apparatus of claim 35, wherein the heat roller is a soft roller and the fusing roller and the separation roller are hard rollers.

40. The apparatus of claim 39, wherein a rigidity of the fusing roller and a rigidity of the separation roller are respectively greater than a rigidity of the heat roller.

41. The apparatus of claim 35, wherein the heat roller and the fusing roller are soft rollers and the separation roller is a hard roller.

42. The apparatus of claim 41, wherein a diameter of the separation roller is less than both a diameter of the fusing roller and a diameter of the heat roller, and a rigidity of the separation roller is greater than a rigidity of the heat roller.

43. The apparatus of claim 35, wherein a rigidity of the separation roller is greater than a rigidity of the heat roller.

44. The apparatus of claim 35, wherein the separation roller is a drive roller that is reversely driven with respect to the heat roller, wherein a circumferential speed of the separation roller is greater than that of the heat roller, which pulls a portion of the recording medium contacting the separation roller and the heat roller in a direction in which the recording medium exits the color fusing apparatus and presses a portion of the recording medium between the separation roller and the fusing roller against the heat roller.

45. The apparatus of claim 35, further comprising a first nip formed where the fusing roller contacts the heat roller and a second nip formed where the separation roller contacts the heat roller, wherein the color toner is melted and fused onto the recording medium as the recording medium passes through the first nip and the recording medium is separated from the heat roller as the recording medium passes through the second nip.

46. The apparatus of claim 45, wherein the heat roller, the fusing roller, and the separation roller each comprises a metal core member and a rubber layer wrapped around the metal core member, wherein a length of the first nip and a length of the second nip are determined according to respective rigidities of each of the rubber layers.

47. The apparatus of claim 45, wherein the heat roller comprises a metal core member and a rubber layer wrapped around the metal core member, wherein a length of the first nip and a length of the second nip are determined according to a rigidity of the rubber layer and respective contact forces of the fusing roller and the separation roller on the heat roller.

48. The apparatus of claim 47, wherein the length of the second nip is determined to separate the recording medium from the heat roller, and the contact force of the fusing roller is set to obtain the length of the first nip that compensates for the length of the second nip.

49. The apparatus of claim 45, wherein a length of the first nip is greater than a length of the second nip.

50. An apparatus to fuse a color toner onto a recording medium, comprising:
a heat roller;
two fusing rollers contacting the heat roller to fuse the color toner onto the recording medium; and
a separation roller separate from the fusing rollers and contacting the heat roller to separate the recording medium from the separation roller.

51. The apparatus of claim 50, wherein the heat roller and the fusing rollers are soft rollers and the separation roller is a hard roller, and a rigidity of the separation roller is greater than that of the heat roller.

52. The apparatus of claim 50, further comprising nips formed respectively where each fusing roller contacts the heat roller and where the separation roller contacts the heat roller, wherein the color toner is melted and fused onto the recording medium as the recording medium passes through the nips formed using the fusing rollers and the recording medium is separated from the heat roller as the recording medium passes through the nip formed using the separation roller.